Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Previously Presented) A back-drivable surgical robot head comprising:

(a) a frame;

(b) an arm for carrying a tool the position of which is to be controlled;

(c) a manually-graspable driving member on said arm; and

(d) a first rotation control mechanism for rotating the arm about an axis with respect to said frame, said first rotation control mechanism comprising:

(i) a first lead screw having a rotational motor coupled at one end thereof, said lead screw and motor being mounted at said one end to pivot with respect to said frame;

(ii) a bearing which moves longitudinally of said first lead screw as it rotates, said bearing being coupled to an offset crank of or secured to said arm, said lead screw taking up a zero pivotal position when said bearing is at said one end of said lead screw, said lead screw pivoting away from the zero position as the bearing moves along said lead screw to a maximal pivotal position in which the bearing is part way along the lead screw, and returning to the zero position as the bearing reaches an extreme position at an end of the lead screw opposite said one end;

said head being back-drivable wherein manual forces applied to said driving member by a user grasping said driving member cause said arm to rotate to a desired position, said motor responding to said manual forces to ensure that said arm moves smoothly to said position with constant low resistance in an unconstrained region and with increasing resistance towards a constraint boundary.

2. (Cancelled)

3. (Previously Presented) A robot head as claimed in claim 1 in which the first motor is directly secured to the first lead screw, without any intervening gears.

4. (Cancelled)

5. (Previously Presented) A robot head as claimed in claim 1 further including a first output position encoder for measuring the angular position of the arm about the axis.

6. (Previously Presented) A robot head as claimed in claim 1 further including a first input position encoder for measuring rotation of the first motor.

7. (Previously Presented) A robot head as claimed in claim 5 in which the measurement from the first output position encoder is compared with an expected arm position based on the measurement from a safety sensor, and an alarm is raised if the expected position is inconsistent with the actual position.

8. (Previously Presented) A robot head as claimed in claim 1 further including a second rotation control mechanism for rotating the arm about a second axis, the said mechanism comprising a second rotational motor coupled to a second lead screw and a bearing which moves longitudinally of the second lead screw as it rotates, the bearing being pivotably coupled to an offset crank of or secured to the arm.

9. (Original) A robot head as claimed in claim 8 in which the second motor and the second lead screw are mounted for pivotal motion with respect to a frame of the head.

10. (Previously Presented) A robot head as claimed in claim 8 in which the second motor is directly secured to the second lead screw, without any intervening gears.

11-14. (Cancelled)

15. (Previously Presented) A robot head as claimed in claim 8 in which the first axis is perpendicular to the second.

16. (Previously Presented) A robot head as claimed in claim 8 in which the arm is extendible along a third axis.

17. (Previously Presented) A robot head as claimed in claim 15 in which the first, second and third axes intersect at a point.

18. (Original) A robot head as claimed in claim 16 in which the arm is extendible on a third lead screw which is rotated by a third rotational motor.

19-23. (Cancelled)

24. (Previously Presented) A robot head as claimed in claim 1 further comprising a force sensor for sensing forces applied to the driving member by a user.

25. (Previously Presented) A robot head as claimed in claim 24 wherein the first rotational control mechanism is arranged to rotate the arm about the first axis is response to the sensed forces.

26. (New) A surgical robot head comprising:

a frame having an upper portion rotatably mounted on a lower portion;

an arm rotatable about a vertical yaw axis in communication with the lower portion of the frame and extending outwardly therefrom wherein the arm is adapted for carrying a surgical saw the position of which is to be controlled;

a manually-graspable driving member on the arm;

a means for controlling a rotational movement of the arm about the vertical yaw axis comprising a rotational motor in operative communication with a lead screw and a bearing traversable along the lead screw as the lead screw rotates;

an offset crank pivotally coupled to the bearing; and

wherein operation of the motor causes reciprocal movement by the lead screw such that the bearing traverses thereon wherein a yaw position associated with the arm is controlled by a linear position of the bearing on the lead screw, wherein the surgical robot head is back-drivable

upon a manual force applied to the driving member by a user grasping the driving member to cause the arm to rotate to a desired position, and the motor responds to the manual forces to ensure that the arm moves smoothly to the desired position with constant low resistance in an unconstrained region and with increasing resistance towards a constraint boundary.

27. (New) The surgical robot of Claim 26 further comprising a locking handle attached to the arm.

28. (New) The surgical robot of Claim 27 further comprising a guide track supporting a portion of the arm.

29. (New) A method of using a surgical saw comprising the steps of:

providing a surgical robot head having a frame with an upper portion rotatably mounted on a lower portion, an arm rotatable about a vertical yaw axis in communication with the lower portion of the frame and extending outwardly therefrom wherein the arm is adapted for carrying a surgical saw the position of which is to be controlled, a manually-graspable driving member on the arm, a means for controlling a rotational movement of the arm about the vertical yaw axis comprising a rotational motor in operative communication with a lead screw and a bearing traversable along the lead screw as the lead screw rotates, and an offset crank pivotally coupled to the bearing; and

back driving the surgical robot head by applying manual forces to the driving member to cause the arm to rotate to a desired position wherein the motor responds to the manual forces to ensure that the arm moves smoothly to the desired position with constant low resistance in an unconstrained region and with increasing resistance towards a constraint boundary.